

Posterior Tibial Slope & Metaphysio-Diaphyseal angle as a marker in detecting osteoarthritis in Indian population

ABSTRACT: Osteoarthritis is a condition that affects the joints, causing pain and stiffness. Accelerated knee osteoarthritis is a unique subset of knee osteoarthritis, which develops joint space narrowing with definite osteophytes and in less than 4 years. The geometry of an articular surface (e.g., posterior tibial slope), may be an important risk factor for development of knee osteoarthritis. The coronal alignment of the knee has been evaluated extensively, but there are only few studies for the sagittal plane alignment. The posterior inclination of the tibial plateau in relation to its longitudinal axis in lateral view is the Posterior Tibial Slope(PTS). No prior study has evaluated posterior tibial slope in relation to osteoarthritis. We hypothesized that individuals with greater or lesser posterior tibial slope angles will greater risk of developing common or accelerated knee osteoarthritis.

MDA is a recent radiological entity gaining clinical significance. The clinical importance of MDA is that it affects the mechanical axis in the sagittal plane by bringing the centre of knee backwards. This study was performed to determine mean posterior

tibial slope(PTS), mean metaphysio-diaphyseal angle(MDA), to study correlation of PTS and MDA changes with osteoarthritic degeneration in Indian population and to assess sensitivity and specificity of PTS and MDA in detecting Osteoarthritis.

Materials and methods: 173 X-rays with PA and lateral views were examined from 121 individuals. Osteoarthritis was classified by Ahlback grading system.

Results: There were 121 individuals in the study with 91 osteoarthritic Knees and 82 normal knees. The mean PTS among normal group is 9.69° [range 5° - 13° SD 1.81] and among arthritic group is 14.05° [range 10° - 24° SD 2.38]. The mean MDA among normal group is 19.87° [range 15° - 30° SD 2.70] and among arthritic group is 25.03° [range 19° - 34° SD 3.05]. There is moderate correlation between PTS and MDA [$r=0.64$]. Sensitivity and Specificity in detecting osteoarthritis with PTS is 96.7% and 85.4% and MDA is 90.1% and 84.7% respectively.

Conclusion: Our study finds that native PTS is similar to that of oriental population but higher than that of Caucasians. There is moderate linear correlation between PTS and MDA. They also serve as a marker in detecting osteoarthritis with good sensitivity and specificity.

Key Words: Knee, Osteoarthritis, Posterior tibial slope(PTS), Metaphysio-diaphyseal angle(MDA), Total knee replacement.